

How to use a star map

This packet has four seasonal sky charts. This page shows you how to read them outside.

Holding the chart

- 1 **Pick the right chart.** Each one lists the dates and times it matches. Close is good enough.
- 2 **Face a direction.** South is a good place to start. Use a compass app if you need to.
- 3 **Turn the chart to match.** Rotate it so the direction you're facing is at the bottom. That edge is now your horizon.
- 4 **Hold it up.** Raise it in front of you, tilted toward the sky. The center of the chart is straight overhead, and the outer circle is the horizon all the way around you.

Why are east and west backwards?

A road map shows the ground from above. A star map shows the sky from below. Lie on your back with your head pointing north, and east really is on your left. Hold the chart overhead and every direction lines up.

Measure the sky with your hand

Hold your arm all the way out. These widths work for almost everyone, because longer arms come with bigger hands.

Pinky width	1°	The Moon is only about ½° wide
Three fingers	5°	The gap between the Big Dipper's pointer stars
Closed fist	10°	Nine fists from the horizon reaches straight up
Spread hand	20–25°	Thumb tip to pinky tip

Sky coordinates cheat sheet

Astronomers use two systems. One is tied to **you** and changes all night. The other is tied to **the stars** and doesn't change.

Where you're standing (horizon system)

Horizon — where the sky meets the ground. The outer circle on every chart.

Zenith — the point straight overhead. The center of every chart.

Altitude — height above the horizon, from 0° to 90° at the zenith. Measure it with your fist.

Azimuth — compass direction: 0° north, 90° east, 180° south, 270° west.

Meridian — the line from due north, through the zenith, to due south. A star is highest when it crosses it.

Where it is on the sky (celestial system)

North celestial pole — the point the whole sky turns around once a day. Polaris is less than 1° from it.

Celestial equator — Earth's equator projected out onto the sky.

Declination — like latitude on the sky: +90° at the pole, 0° on the celestial equator.

Right ascension — like longitude on the sky, measured eastward in hours from 0h to 24h.

Ecliptic — the Sun's yearly path through the stars. The Moon and planets stay close to it, so look for them along the dashed gold line.

One rule worth memorizing

The altitude of Polaris equals your latitude. At 42° N, Polaris sits about four fists above the northern horizon, all night, every night.

Before you go out

- Give your eyes 20–30 minutes in the dark. One look at a bright phone screen starts the clock over.
- Read the chart with a red light: a phone in night mode, or red cellophane over a flashlight.
- Check the Moon. A bright Moon washes out faint stars.
- Preview tonight's sky in Stellarium before you head out.

Constellation checklist

The 24 constellations we learn this semester. Check each one off the first time you find it in the real sky.

Circumpolar — visible every clear night of the year

☐ Ursa Major	The Big Dipper: seven bright stars in a ladle shape	Date: _____
☐ Ursa Minor	The Little Dipper; Polaris is the end of its handle	Date: _____
☐ Cassiopeia	A bright W or M, across Polaris from the Big Dipper	Date: _____
☐ Cepheus	A faint house shape next to Cassiopeia	Date: _____
☐ Draco	A long, dim dragon winding between the two Dippers	Date: _____

Winter (Dec–Mar evenings)

☐ Orion	Three stars in a row (the Belt) inside a bright hourglass	Date: _____
☐ Taurus	Orange Aldebaran in a V; the Pleiades star cluster nearby	Date: _____
☐ Gemini	Twin stars Castor and Pollux, side by side	Date: _____
☐ Canis Major	Sirius, the brightest star in the night sky	Date: _____
☐ Canis Minor	Procyon, bright and nearly alone	Date: _____
☐ Auriga	A pentagon of stars led by yellow Capella, high overhead	Date: _____

Spring (Apr–Jun evenings)

☐ Leo	A backward question mark (the Sickle) with Regulus at its base	Date: _____
☐ Boötes	A kite shape with orange Arcturus at its tip	Date: _____
☐ Virgo	Wide and faint; bright blue-white Spica stands out	Date: _____
☐ Corona Borealis	A small, tight semicircle of stars next to Boötes	Date: _____

Summer (Jul–Sep evenings)

☐ Lyra	A small parallelogram hanging from brilliant Vega	Date: _____
☐ Cygnus	The Northern Cross, lying along the Milky Way; Deneb at the top	Date: _____
☐ Aquila	Altair, with a small, dimmer star on each side	Date: _____
☐ Hercules	The Keystone, a lopsided square between Vega and Arcturus	Date: _____
☐ Scorpius	Red Antares and a curling tail, low in the south	Date: _____
☐ Sagittarius	The Teapot, low in the south; the Milky Way rises from its spout	Date: _____

Autumn (Oct–Dec evenings)

☐ Pegasus	The Great Square, four stars in a large box	Date: _____
☐ Andromeda	Two curved lines of stars off one corner of the Square	Date: _____
☐ Perseus	An arc of stars between Cassiopeia and the Pleiades	Date: _____

Star-hopping: use what you know to find what you don't

Pointers to Polaris. The two stars at the end of the Big Dipper's bowl point to Polaris — about five times the distance between them.

Arc to Arcturus, spike to Spica. Follow the curve of the Dipper's handle away from the bowl to Arcturus, then keep going the same way to Spica.

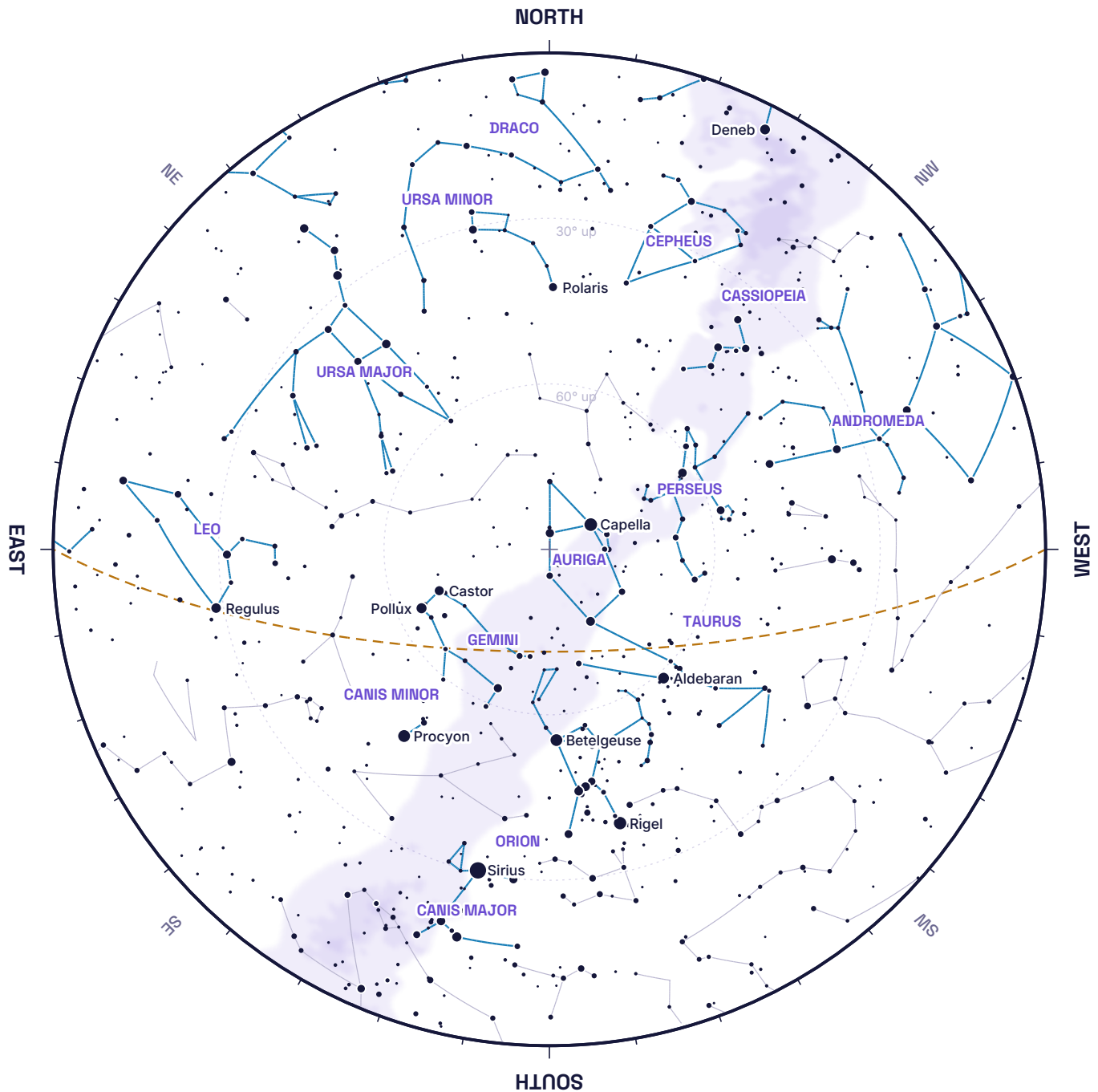
Orion's Belt points both ways. Follow the Belt down and to the left to Sirius; up and to the right to Aldebaran and the Pleiades.

The Summer Triangle. Vega, Deneb, and Altair — the three brightest stars high overhead on summer and early-fall evenings.

Square to Andromeda. The Great Square's northeast corner star belongs to Andromeda. Go two stars along Andromeda, turn toward Cassiopeia, and hop two more. Just past them is a faint smudge: the Andromeda Galaxy, 2.5 million light-years away.

Winter evening sky

This chart matches the sky at: 11 PM early Jan · 10 PM mid-Jan · 9 PM early Feb · 8 PM mid-Feb · 7 PM early Mar



Key

● ● ● ● ● Star brightness (magnitude) — smaller number = brighter
0 1 2 3 4

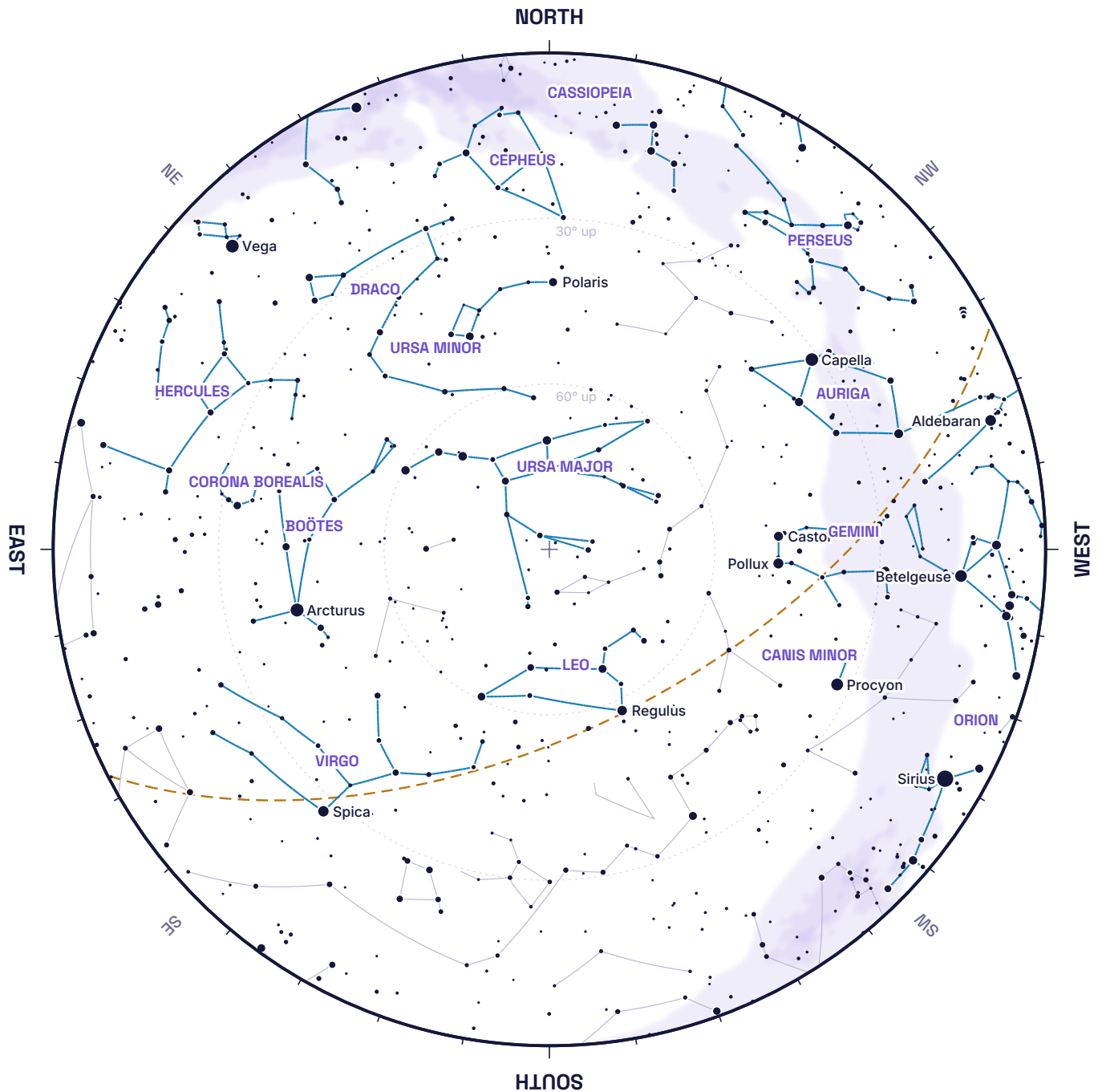
— Constellations on your checklist — Other constellations — — Ecliptic — look for planets here

Find tonight

- Find Orion's Belt in the south, then hop to Sirius and Aldebaran.
- Look almost straight up for Capella and the pentagon of Auriga.
- The Winter Milky Way runs faintly from Auriga down past Orion.

Spring evening sky

This chart matches the sky at: 11 PM early Apr · 10 PM mid-Apr · 9 PM early May · 8 PM mid-May · 7 PM early Jun



Key

● ● ● ● ● Star brightness (magnitude) — smaller number = brighter
0 1 2 3 4

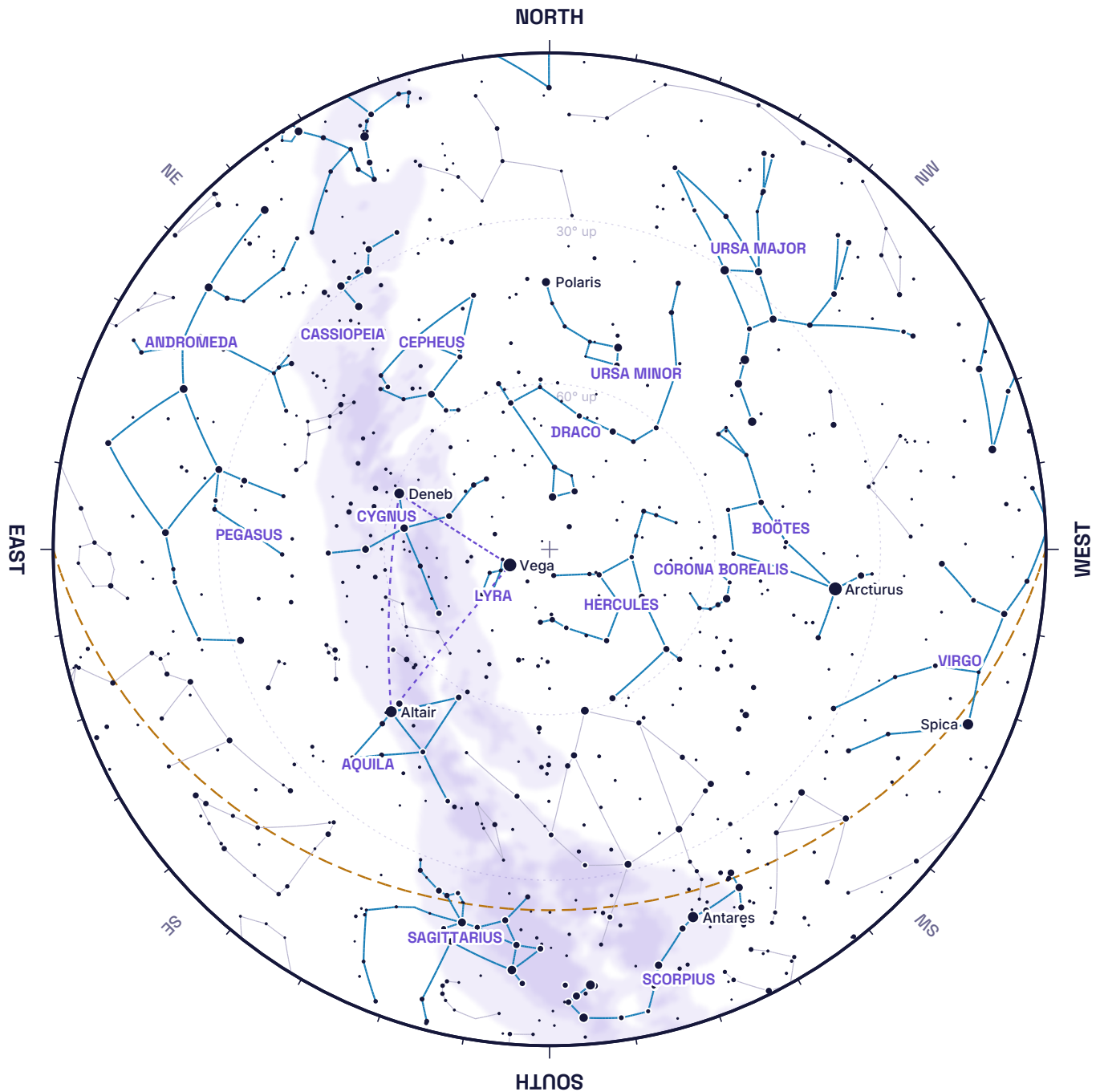
— Constellations on your checklist — Other constellations - - - Ecliptic — look for planets here

Find tonight

- The Big Dipper is upside down, high overhead — start there.
- Arc to Arcturus in the east, then spike to Spica, low in the southeast.
- Leo's Sickle and Regulus are high in the south.

Summer evening sky

This chart matches the sky at: 11 PM mid-Jul · 10 PM early Aug · 9 PM mid-Aug · 8 PM early Sep · 7 PM mid-Sep



Key

● ● ● ● ● Star brightness (magnitude) — smaller number = brighter
0 1 2 3 4

— Constellations on your checklist

— Other constellations

--- Ecliptic — look for planets here

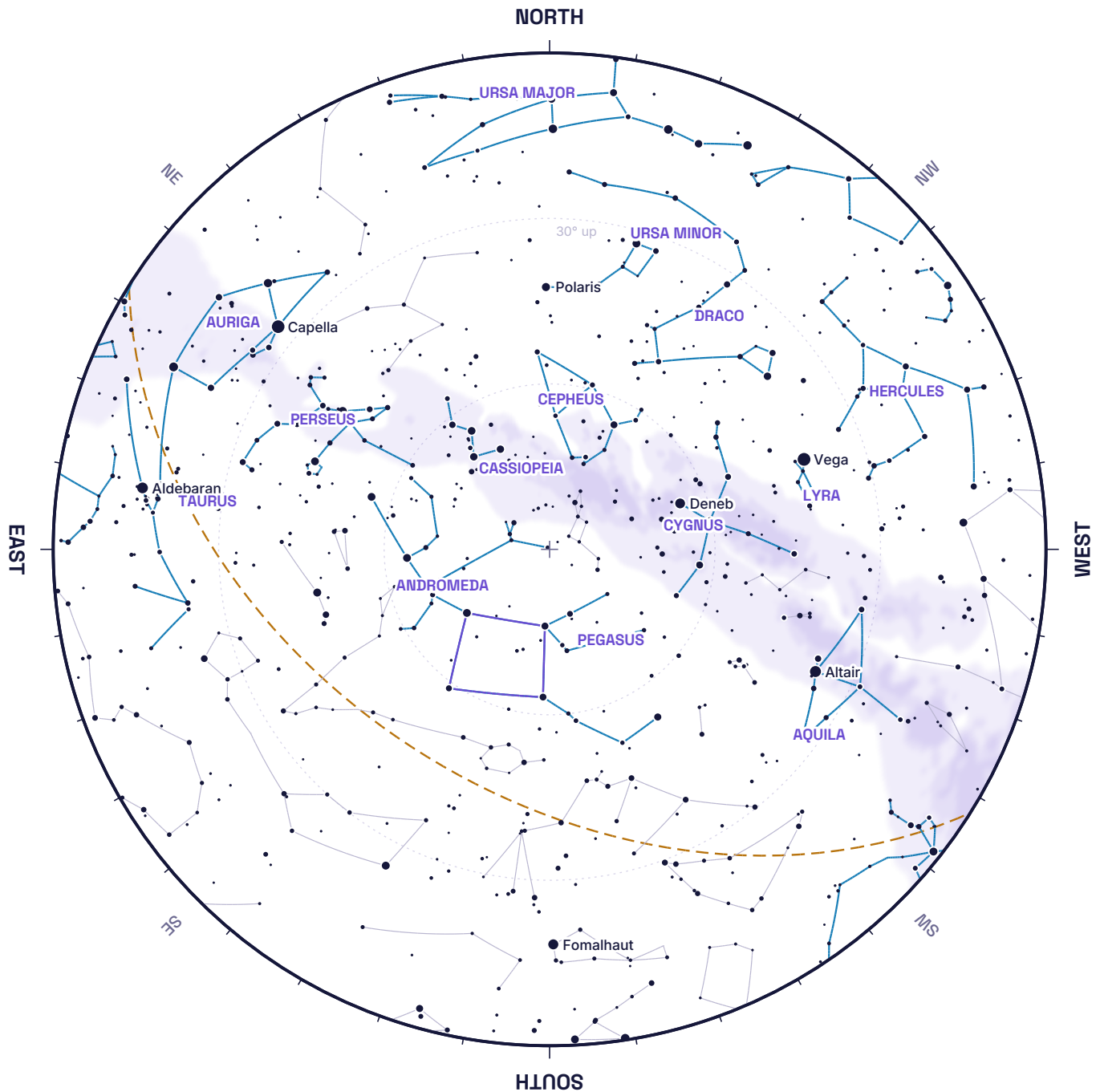
--- Asterism

Find tonight

- Vega is nearly overhead; the dashed violet lines mark the Summer Triangle.
- Scorpius and the Teapot of Sagittarius sit low in the south.
- From a dark site, the Milky Way runs from Cygnus down to Sagittarius.

Autumn evening sky

This chart matches the sky at: 11 PM early Oct · 10 PM mid-Oct · 9 PM early Nov · 7 PM mid-Nov (clocks fall back)



Key

● ● ● ● ● Star brightness (magnitude) — smaller number = brighter
0 1 2 3 4

— Constellations on your checklist

— Other constellations

- - - Ecliptic — look for planets here

- - - Asterism

Find tonight

- The Great Square of Pegasus is high in the south (dashed violet box).
- Cassiopeia's W is nearly overhead; the Big Dipper sits low in the north.
- Hunt for the Andromeda Galaxy off the Square's northeast corner.